## What is claimed is:

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- 1. A porous substrate, comprising a plurality of porous layers 1 thereon, wherein the average opening diameter of pores in a porous 2 layer of said plurality of porous layers positioned in an outermost 3 surface is smaller than the average diameter of pores in a porous 4 layer of said plurality of por ous layers positioned on a substrate 6 side relative to said porou $\phi$  layer positioned in said outermost 7 surface.
- 2. A porous substrate, comprising a plurality of porous layers 1 thereon, wherein the average opening diameter of pores in a porous 2 3 layer of said plurality of porous layers positioned in an outermost surface is smaller than the average diameter of pores in a porous 4 layer of said plurality of porous layers positioned on a substrate 5 side relative to said porous layer positioned in said outermost 6 surface; and the volume porosity of said plurality of porous layers 7 is 10 % - 90 %.
- 3. A porous substrate, comprising two porous layers thereon, 1 wherein the average opening diameter of pores in a first porous 2 layer of said two porous layers positioned in an outermost surface 3 is smaller than the average diameter of pores in a second porous 4 layer positioned on a substrate side relative to said first porous 5 layer; and more than  $5\phi$  % of said pores in said first porous layer 6 penetrate from the surface of said first porous layer to the 7 interface between said first and second porous layer. 8



- 4. A porous substrate, comprising /two porous layers thereon, 1 wherein the average opening diamete $\not r$  of pores in a first porous 2 layer of said two porous layers positioned in an outermost surface 3 4 is smaller than the average diameter of pores in a second porous layer positioned on a substrate side relative to said first porous 5 layer; more than 50 % of said pores in said first porous layer 6 7 penetrate from the surface of said first porous layer to the interface between said first and second porous layer; and the 8 volume porosity of said first/and second porous layer is 10 %9 10 90 %.
- 5. The porous substrate a  $\phi$  cording to claim 3 or 4, wherein 1 2 said first porous layer comprises a metal material.
- 6. The porous substrate according to claim 3 or 4, wherein 1 said first porous layer comprises a metal oxide, a metal nitride, 2 3 or a metal carbide.
- 7. The porous substrate according to claim 3 or 4, wherein 1 2 said second porous layer comprises a semiconductor material.
- 8. The porous substrate according to claim 3 or 4, wherein 1 said second porous layer comprises a group III nitride series 2 3 compound semiconductor material.
- 1 9. The porous substrate according to claim 3 or 4, wherein said first porous layer comprises TiN or Pt, and said second porous 2 REPLACED BY
  ANT 34 AND T 3 layer comprises GaN.

- 1 10. The porous substrate according to claim 3 or 4, wherein
- 2 said average opening diameter of said porosity in said first porous
- 3 layer is not more than 1µm.
- 1 11. The porous substrate according to claim 3 or 4, wherein
- 2 the film thickness of said first porous layer is not more than
- $3 \quad 1\mu m$ .
- 1 12. A fabrication method for a porous substrate, comprising
- 2 growing two or more different material layers on a substrate,
- 3 heating said each layer, and thereby forming two or more porous
- 4 layers with pores therein.
- 1 13. A GaN series semiconductor layered substrate, comprising
- 2 a GaN series semiconductor layer grown on a porous substrate
- .3 defined in any one of claims 1-11.
- 1 14. A fabrication method for a GaN series semiconductor layered
- 2 substrate, comprising growing two or more different material
- 3 layers on a substrate, heating said each layer, thereby forming
- 4 a porous substrate with two or more porous layers having pores
- 5 therein, and growing a GaN semiconductor layer on that porous
- 6 substrate.

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